IS 11715-1 (2011): Aerospace - Lead and Runout Threads, Part 1: Rolled External Threads [TED 14: Aircraft and Space Vehicles]

BLANK PAGE

IS 11715 (Part 1) : 2011
ISO 3353-1 : 2002

भारतीय मानक

वायुयान — लीड एवं रनआउट चूड़ियाँ

भाग 1 बेल्लित बाहरी चूड़ियाँ

(पहला पुनरीक्षण)

Indian Standard

AEROSPACE — LEAD AND RUNOUT THREADS

PART 1 ROLLED EXTERNAL THREADS

(First Revision)

ICS 49.030.10

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

June 2011 **Price Group 6**

Aircraft, Space Vehicles, Air Cargo Handling and Aircraft Electrical Equipment Sectional Committee, TED 14

NATIONAL FOREWORD

This Indian Standard (Part 1) (First Revision) which is identical with ISO 3353-1 : 2002 'Aerospace — Lead and runout threads — Part 1: Rolled external threads' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of the Aircraft, Space Vehicles, Air Cargo Handling and Aircraft Electrical Equipment Sectional Committee and approval of the Transport Engineering Division Council.

This standard was first published in 1986 by adopting ISO 3353 : 1976 'Rolled threads for aerospace fasteners'. This standard has been undertaken with a view to bring it in line with the latest version of ISO 3353 published in two parts.

This standard is also published in two parts. Other part is:

Part 2 Internal threads

The text of ISO Standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'.

b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

NATIONAL EXPLANATORY NOTE

The Committee decided to make following editorial correction in the second para of Annex A:

Substitute the words "longer time" for "longer".

Indian Standard

AEROSPACE — LEAD AND RUNOUT THREADS

PART 1 ROLLED EXTERNAL THREADS

(First Revision)

1 Scope

This part of ISO 3353 specifies the lead and runout requirements for rolled external threads for aerospace construction, and the inspection method to be used in case of dispute.

It is applicable whenever it is referenced in a definition document.

2 Terms and definitions

For the purposes of this part of ISO 3353, the following terms and definitions apply.

2.1
lead threads
part of screw threads consisting of threads incompletely formed during rolling, beginning at the entering chamfer of the thread

2.2
runout threads
part of screw threads in which are located threads incompletely formed during rolling, between the completely formed threads and the part which has not been rolled

2.3
completely formed thread
thread, the profile of which (ABC) is located, over an axial distance of 1P, within the limits specified in the definition document for the thread

See Figure 1.

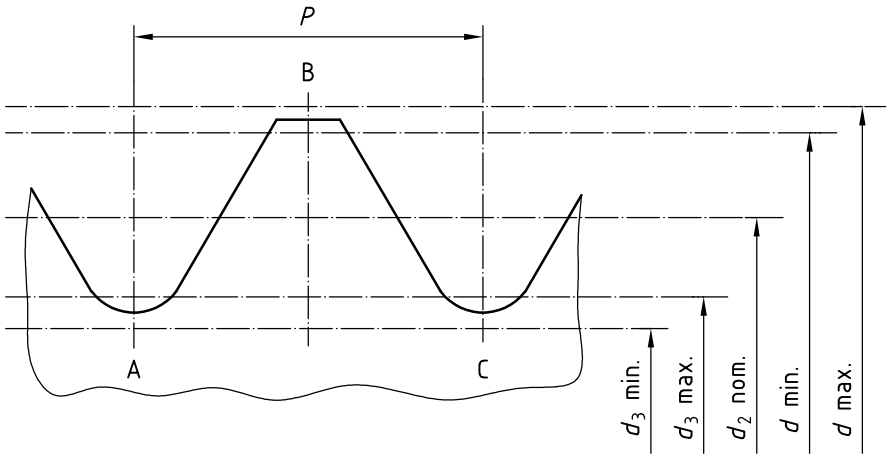


Figure 1

3 Symbols for threads

d is the major diameter of the thread.

d_2 is the pitch diameter of the thread.

d_3 is the minor diameter of the thread.

P is the thread pitch.

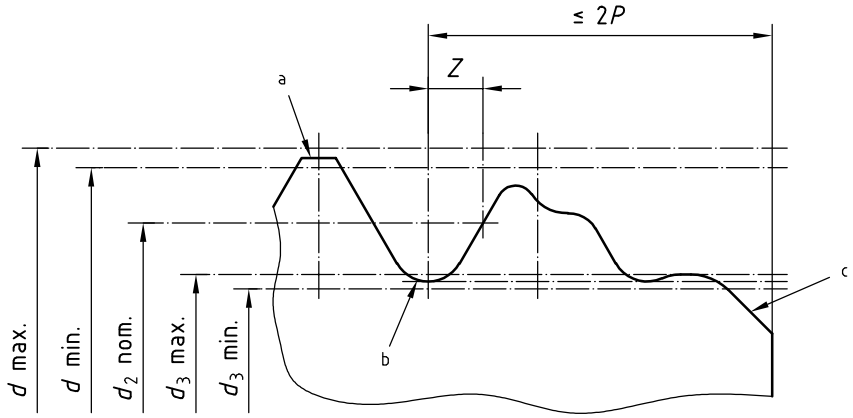
4 Requirements

4.1 General requirements

The flanks at the root of the incompletely formed threads shall be joined by a radius or by two radii and a flat, that are smooth and devoid of abrupt tool marks. This radius, or these radii and the radius r (see Figures 3 to 9) shall be greater than or equal to the minimum root radius specified for the complete threads in the definition document for the thread.

4.2 Lead threads

See Figure 2.



Over the area *Z*, the thread shall lie within the limits specified in the definition document for the thread.

a Crest of first completely formed thread.

b Root of first completely formed thread.

c Chamfer.

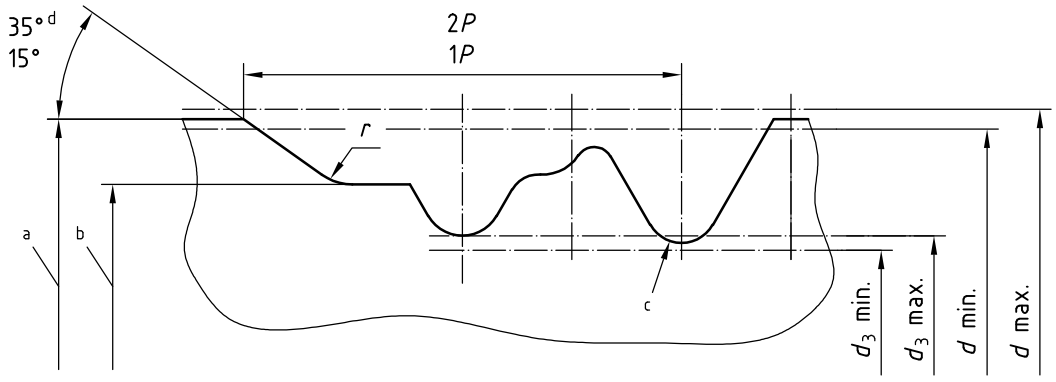
Figure 2

The possible profile projection comparator inspection shall be carried out using a chart drawn in accordance with Figure 10.

4.3 Runout threads

4.3.1 Normal shank

See Figures 3 and 4.



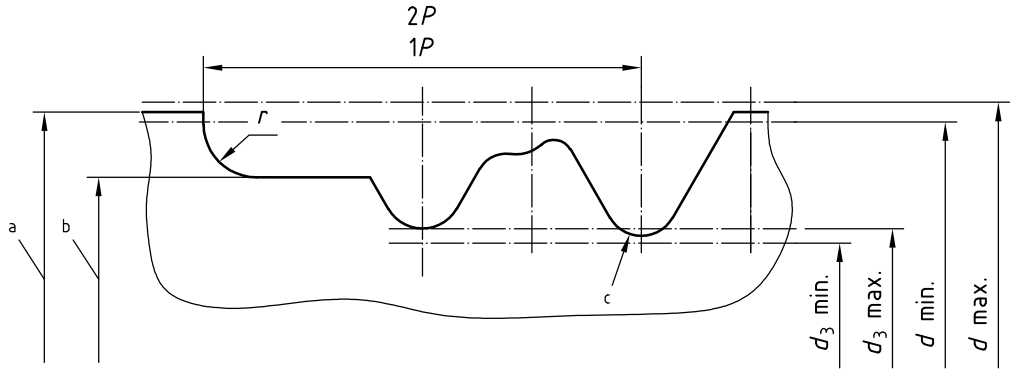
a Shank diameter having a nominal value equal to the nominal diameter of the thread = δ.

b Blank diameter.

c Root of last completely formed thread.

d Angle before rolling. The shape is optional within these limits.

Figure 3



a Shank diameter having a nominal value equal to the nominal diameter of the thread = δ.

b Blank diameter.

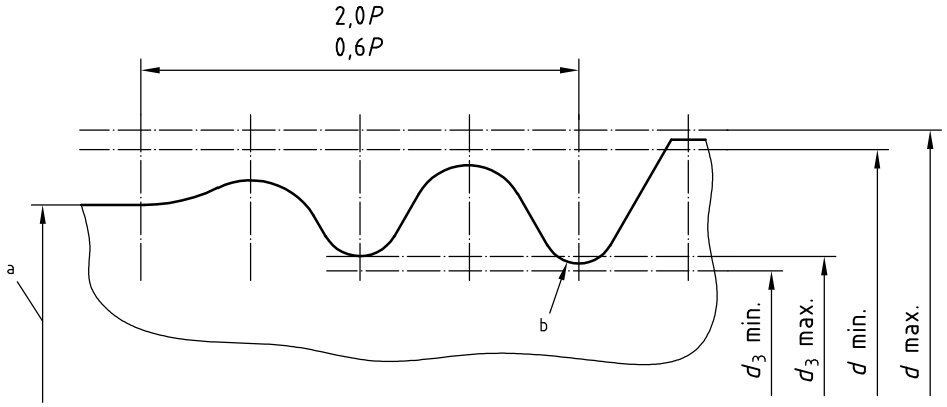
c Root of last completely formed thread.

Figure 4

The possible profile projection comparator inspection shall be carried out using a chart drawn in accordance with Figure 11.

4.3.2 Pitch diameter shank

See Figure 5.



a Shank diameter having a nominal value equal to the maximum pitch diameter = δ.

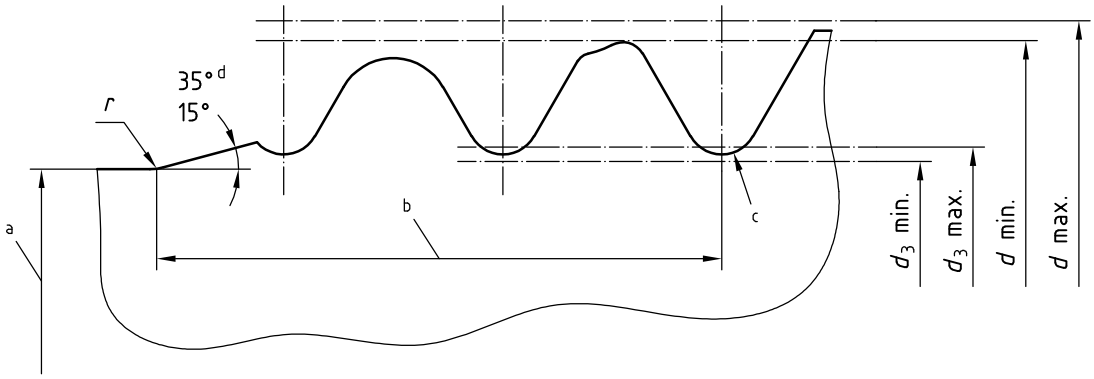
b Root of last completely formed thread.

Figure 5

The possible profile projection comparator inspection shall be carried out using a chart drawn in accordance with Figure 12.

4.3.3 Stepped shank

See Figure 6.



a Diameter of stepped shank, having a nominal value equal to d_3 min. − 0,1 mm = δ.

b $\left[1P + \frac{(d\,\text{max.} - \delta\,\text{nom.})}{2\tan 35°}\right]$ to $\left[2P + \frac{(d\,\text{max.} - \delta\,\text{nom.})}{2\tan 15°}\right]$

c Root of last completely formed thread.

d Angle before rolling. The shape is optional within these limits.

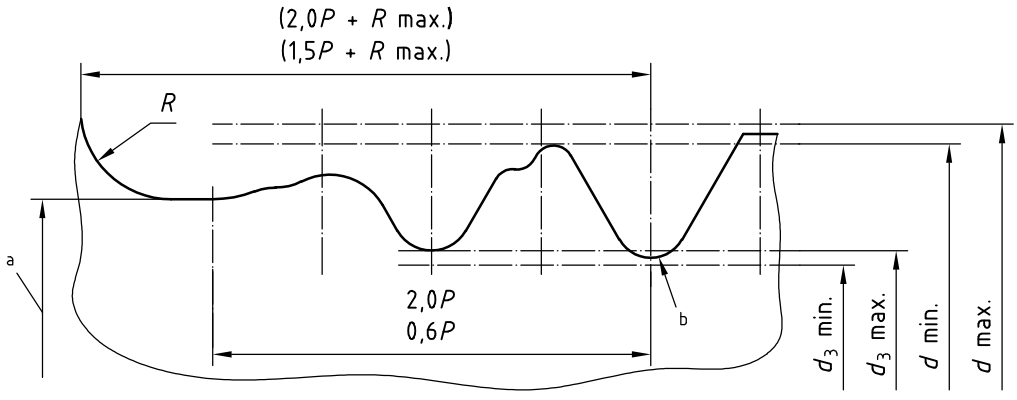
Figure 6

The possible profile projection comparator inspection shall be carried out using a chart drawn in accordance with Figure 13.

4.3.4 Screws threaded to the head and bolts threaded to a shoulder

4.3.4.1 Protruding head

See Figure 7.



The beginning of the first thread shall not encroach on the radius R.

a Blank diameter.

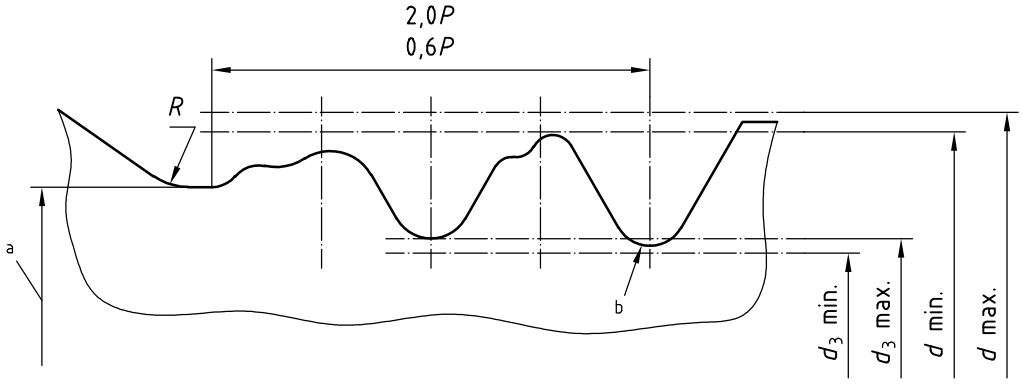
b Root of last completely formed thread.

Figure 7

The possible profile projection comparator inspection shall be carried out using a chart drawn in accordance with Figure 12.

4.3.4.2 Flush head

See Figure 8.



The beginning of the first thread shall not encroach on the radius R.

a Blank diameter.

b Root of last completely formed thread.

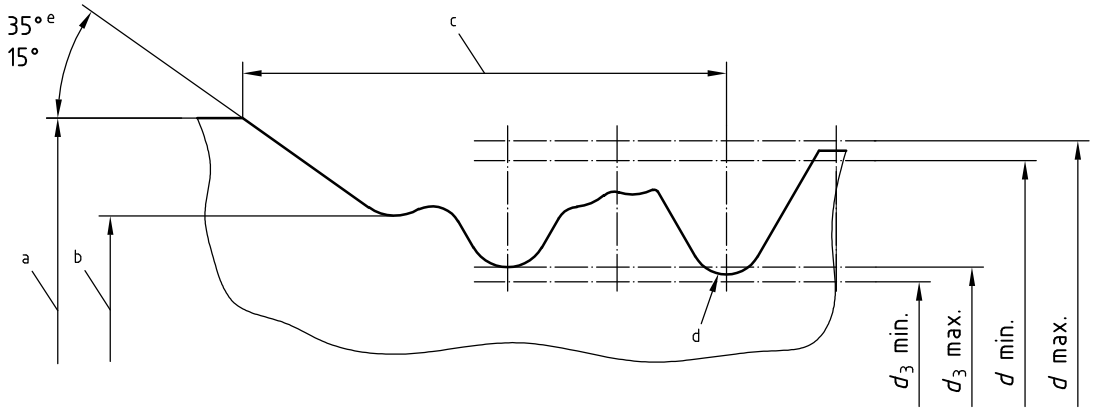
Figure 8

The possible profile projection comparator inspection shall be carried out using a chart drawn in accordance with Figure 12.

4.3.5 Oversized bolts

EXAMPLE Bolts for repairs.

See Figure 9.



a Diameter of oversized shank = δ.

b Blank diameter.

c $\left[1P + \frac{(\delta\text{nom.} - d\,\text{max.})}{2\tan 35°}\right]$ to $\left[2P + \frac{(\delta\text{nom.} - d\,\text{max.})}{2\tan 15°}\right]$

d Root of last completely formed thread.

e Angle before rolling. The shape is optional within these limits.

Figure 9

The possible profile projection comparator inspection shall be carried out using a chart drawn in accordance with Figure 14.

5 Inspection method

5.1 General

The method is left to the discretion of the manufacturer, provided that it ensures conformity with the requirements given in clause 4.

In case of dispute, the method by optical projection, defined hereafter, shall be used. See comments in annex A (informative).

5.2 Use of the charts

The charts shall be used in conjunction with a profile projection comparator having a magnifying power equal to or greater than × 20.

5.3 Procedure

5.3.1 For lead threads

The inspection shall be carried out using a chart drawn in accordance with Figure 10.

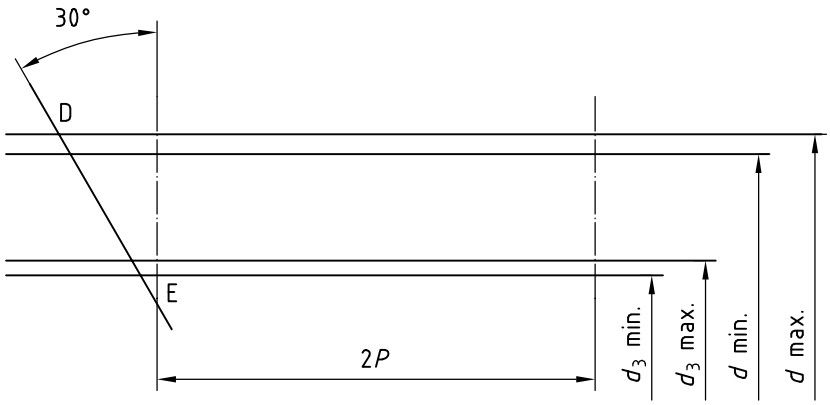


Figure 10

Rotate the bolt to find the first complete thread (see Figure 1) nearest to the end of the shank which has the thread crest and root not extending beyond the limits defined by the horizontal lines.

Then move the bolt horizontally until the right flank of the above thread coincides with line DE.

5.3.2 For runout threads

The inspection shall be carried out using a chart drawn in accordance with Figures 11 to 14.

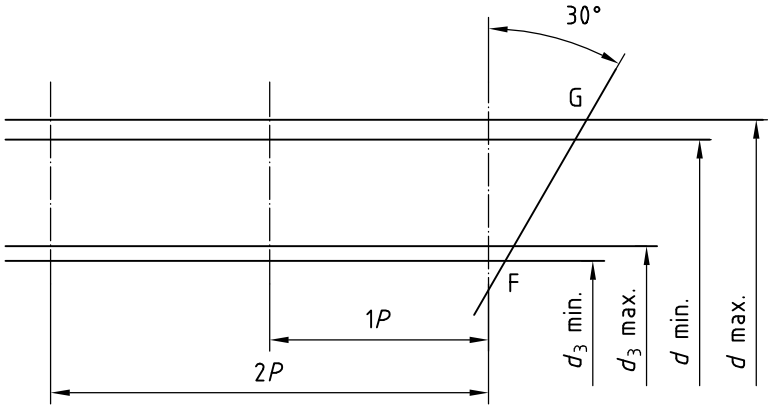


Figure 11

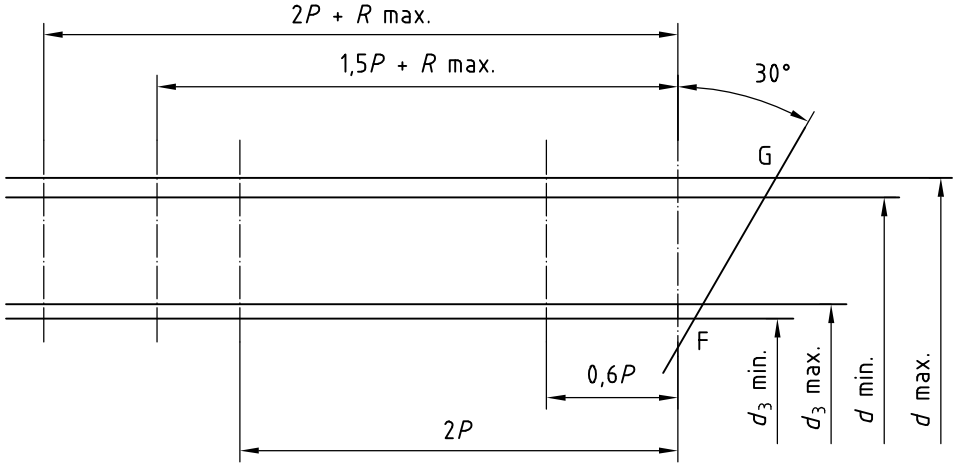
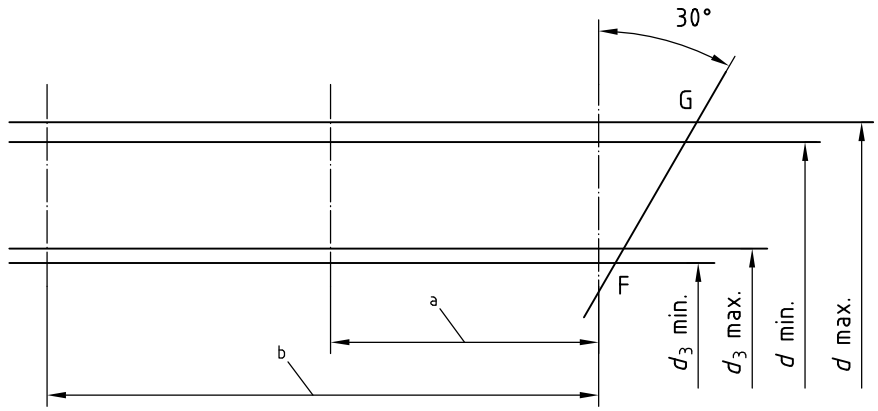


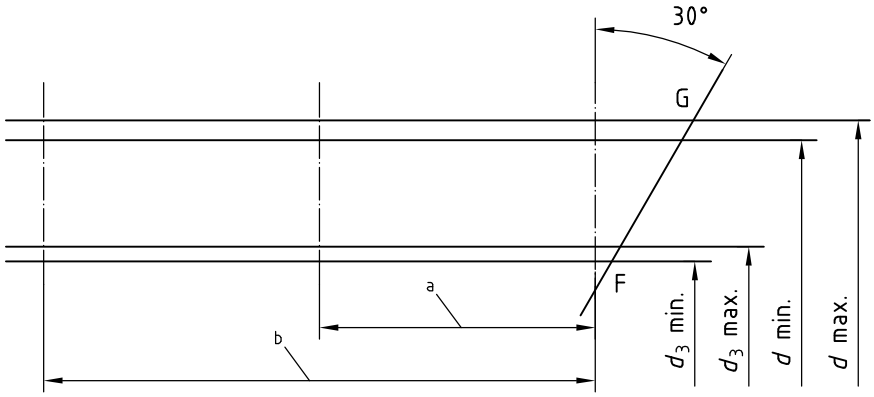
Figure 12



a $\left[1P + \frac{(d\,\text{max.} - \delta\text{nom.})}{2\tan 35°}\right]$

b $\left[2P + \frac{(d\,\text{max.} - \delta\text{nom.})}{2\tan 15°}\right]$

Figure 13



a $\left[1P + \frac{(\delta\text{nom.} - d\,\text{max.})}{2\tan 35°}\right]$

b $\left[2P + \frac{(\delta\text{nom.} - d\,\text{max.})}{2\tan 15°}\right]$

Figure 14

Rotate the bolt to find the last complete thread (see Figure 1) nearest to the plain shank of the bolt which has the thread crest and root not extending beyond the limits defined by the horizontal lines.

Then move the bolt horizontally until the left flank of the above thread coincides with line FG.

Annex A
(informative)

Comments on inspection method

Assembling the bolt to be checked with a GO screw ring gauge, without entering chamfer, is the preferred method for checking lead and runout threads and produces consistent results.

Alternatively, the profile projection comparator method, while theoretically more accurate, takes considerably longer and depends on the skill of the operator.

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 1986 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards: Monthly Additions'.

This Indian Standard has been developed from Doc No. : TED 14 (667).

Amendments Issued Since Publication

Amendment No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *Website*: www.bis.org.in

Regional Offices: *Telephones*

Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002 — 2323 7617, 2323 3841

Eastern : 1/14, C.I.T. Scheme VII M, V.I.P. Road, Kankurgachi, KOLKATA 700054 — 2337 8499, 2337 8561, 2337 8626, 2337 9120

Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022 — 260 3843, 260 9285

Southern : C.I.T. Campus, IV Cross Road, CHENNAI 600113 — 2254 1216, 2254 1442, 2254 2519, 2254 2315

Western : Manakalaya, E9 MIDC, Marol, Andheri (East), MUMBAI 400093 — 2832 9295, 2832 7858, 2832 7891, 2832 7892

Branches: AHMEDABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE. DEHRADUN. FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. LUCKNOW. NAGPUR. PARWANOO. PATNA. PUNE. RAJKOT. THIRUVANATHAPURAM. VISAKHAPATNAM.

Published by BIS, New Delhi